PUMPING OILY LIQUIDS

OBJECTIVE & STRATEGY

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The objective of the Pumping Oily Liquids tactic is to transfer liquid wastes into storage in preparation for disposal.

The general strategy is to:

1. Identify the transfer site and assess the conditions.
2. Determine the preferred pumping system based on site considerations and waste characteristics.
3. Mobilize and deploy the equipment.
4. Transfer oily liquids to secondary storage.
5. Monitor the system during operations.

TACTIC DESCRIPTION

Pumping oily liquids requires a system of pumps, hoses, fittings, oil storage devices, and trained personnel. This tactic contains an expanded description of pumping oily liquids, a task that is integral to several other tactics. Therefore, the personnel required for this tactic are already listed in the parent tactic. The components are selected to maximize safety and efficiency and are adaptable to site considerations and the waste characteristics. Site considerations include the operating environment and distances the oil is to be moved. Waste characteristics include possible explosive potential or flash point, debris content, and viscosity of the fluids.

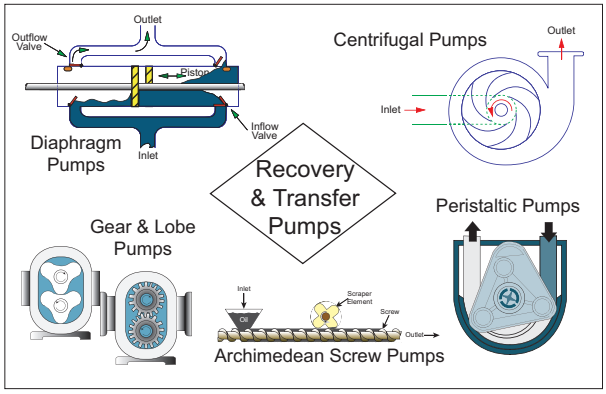

Figure POL-1. Transfer pump options.

Pumping Systems

Successful oil spill response often hinges on the effectiveness and reliability of the transfer pumps. The capabilities of the pumps used during the transfer of oily liquids should be matched with the situational factors encountered during operations. This is especially true in a long term response where efficiency and maintenance become critical. The factors to be considered in selection of the pumping system are:

- Viscosity of the fluids
- Debris content

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- Transfer rates required
- Suction head or pressure required
- Possible loss of prime
- Possibility to run dry
- The pump's ability to safely move hazardous material
- Distance the product has to moved

A general description of the typical pumps used in oil spill response follows.

Centrifugal pump These pumps have high capacities for moving low viscosity fluids. Output decreases rapidly with increases in viscosity. They are able to tolerate small diameter debris.

Diaphragm pump A diaphragm pump can handle a wide range of fluids reasonably well. They are safer for transfer of hazardous materials.

Gear/lobe/screw pump These pumps are able to pump very viscous fluids but do not tolerate abrasive debris.

Hose/peristaltic pump These pumps are capable of handling fluids of all viscosities, and handle hazardous materials.

Piston pump These pumps are able to pump a wide range of fluids at a high output rate. They cannot be run dry and are generally unable to handle debris due to tight tolerances.

Progressive cavity pump These pumps can handle small amounts of debris, but may be damaged by large debris. They generally handle low-to-medium viscosity fluids. They produce uniform discharge and can be operated with reduced fluid intake, but should not be operated dry.

Archimedean screw pump These pumps offer very little suction by using mechanical lifting properties to move highly viscous material. It can handle most debris.

Vane Pump These pumps can manage a wide range of viscosity reasonably well, but can be damaged by debris and cannot be run dry.

Vacuum systems These units use a vacuum to bring fluids through the hoses. They are able to handle debris well and can provide significant head pressures. They require specific suction hoses to ensure the vacuum pressure.

When a variety of pumps is available, the following table will assist in matching a pump with the transfer needs.

For example, a smaller recovery barge containing crude oil and oily water needs to be pumped into a storage barge so that the smaller barge may resume recovery operations. The factors presented here would lead to the choice of a pump that can tolerate a range of viscosity (crude oil and water), handle small amounts of debris (recovered during skimming operations), provide good suction or

head pressure (oil must be pushed or pulled up to a larger barge), and complete the transfer quickly to enable the barge to resume operations. Explosive potential should always be considered. Personnel will monitor the operation during the entire transfer; therefore the ability to run dry is a non-factor.

	Viscosity	Output/ Transfer Rate	Debris Tolerance[1]	Self Priming	Suction Head/ Pressure	Able to Run Dry
Centrifugal	Low/Medium	High	Yes	No	Poor	No
Hose/peristaltic	Wide range	High	No	Yes	Good	Yes
Vacuum	Wide range	High	Yes	Yes	Good	Yes
Piston	Wide range	High	No	Yes	Good	No
Progressive cavity	Low/Medium	Med	Yes	Yes	Good	No
Diaphragm	Wide range	Med	No	No	Good	No
Vane	Wide range	Med	No	Yes	Fair	No
Gear/Lobe/Screw	High/Medium	Low	No	Yes	Fair	No
Archimedean screw	High	Low	Yes	Yes	Poor	No

NOTE: [1]Debris can damage the hose used with any pump.

Operating Environments

The Pumping Oily Liquids tactic will be used in all areas of operation that are deemed safe. Refer to the specific tactic in which the pumping is to occur for individual considerations during operation.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

SAFETY

- Explosive potential should be assessed prior to operations.
- Response personnel should wear PPE as required by the incident-specific Site Safety Plan.
- Gasoline driven pumps should not be used if there is potential for explosive vapors.

DEPLOYMENT

- Hoses and fittings should be inspected and replaced if they are questionable.
- All hoses, prior to use, need to be inspected to ensure they have gaskets. Any air leaks on the suction side will hinder pumping operations.
- Select hose types that are compatible with the product(s) that are being transferred.
- Tank levels need to be continuously monitored and confirmed to prevent overfilling.
- Position pumps and hoses to ensure they are protected from damage by vehicles or equipment.

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- Adequate surface liners and sorbents should be placed under any potential spill sites.
- Large debris needs to be separated and disposed of as oily solid waste.
- All individuals involved in the transfer need to be informed of the estimated pumping rate, time to complete the operation, and emergency stop procedures.
- Pumping should start at lower rates of transfer to ensure there are no leaks and that valves are properly aligned, and then the rate may be increased.
- When the hose is disconnected, it should be positioned to drain back into the tank and then the end should be fitted with a suitable cap or blank to minimize secondary spills.
- Environmental operating conditions need to be considered when selecting prime mover pumping systems; as an example, pneumatic pumps are problematic in freezing temperatures.
- All transfers should be documented in the unit log.
- Make sure hose cam fittings are secured to prevent accidental spills.
- Place absorbent pads or drip pan under fittings as an extra precaution.

REFERENCES TO OTHER TACTICS

Other tactics associated with Pumping Oily Liquids include:

- MST Marine-based Storage and Transfer
- LST Land-based Storage and Transfer

EQUIPMENT AND PERSONNEL RESOURCES

Refer to recovery tactic being used to adapt the personnel and equipment needs.

Oily Liquid Pumping System POL

Typical Equipment	Function	Quantity	Notes
Pump	Fluid Transfer	Task-specific	Depending on site considerations and fluid characteristics
Hoses and couplings	Fluid Transfer	Task-specific	Ensure component compatibility prior to deployment
Storage device	Receive Fluids	Task-specific	Ensure component compatibility prior to deployment
Typical Personnel*	**Function**	**Quantity**	**Notes**
Field Team Leader	Supervises operations	1	May not always be on-site
Skilled Technicians	Operates pumping equipment	2 to 4	Depending on number of pumps and distance of transfer
General Technicians	Work under the direction of skilled technicians	2 to 8	Depending on number of pumps and distance of transfer

*Personnel required for this tactic may be the same personnel listed in another tactic. For example, the personnel listed in Marine Recovery may also be responsible for pumping oily liquids they recover into a secondary storage device.